WHAT IS CLAIMED IS:

1. A ceramic article, comprising:

a substrate consisting essentially of alumina; and

a corrosion-resistant coating provided on the substrate and consisting essentially of a rare earth oxide, the corrosion-resistant coating directly contacting the substrate such that the ceramic article is free of intervening layers between the substrate and the corrosion-resistant coating, the corrosion-resistant coating having an adhesion strength not less than about 15 MPa.

2. The article of claim 1, wherein the ceramic article comprises a component of a semiconductor processing apparatus.

3. The article of claim 2, wherein the component is a chamber wall.

4. The article of claim 3, wherein the component is a chamber lid.

5. The article of claim 3, wherein the component is a chamber sidewall.

6. The article of claim 1, wherein the corrosion resistant layer has an adhesion strength of not less than 20 MPa.

7. The article of claim 1, wherein the corrosion resistant layer has an adhesion strength of not less than 25 MPa.

8. The article of claim 1, wherein the corrosion resistant layer has an adhesion strength of not less than 30 MPa.

9. The article of claim 1, wherein the corrosion resistant layer is deposited on the ceramic base material by thermal spraying.

10. The article of claim 1, wherein the corrosion resistant layer consists essentially of yttria.

11. The article of claim 1, wherein the corrosion resistant coating has an average grain size not greater than about 0.5 microns.

12. The article of claim 1, wherein the substrate consists essentially of α-alumina.

13. A ceramic article, comprising:

a substrate consisting essentially of alumina;

a corrosion-resistant coating provided on the substrate and consisting essentially of a rare earth oxide, the corrosion-resistant coating having an adhesion strength not less than about 15 MPa and an average grain size not greater than about 0.5 microns.

14. The article of claim 13, wherein the average grain size is not greater than about 0.3 microns.

15. A method for forming a ceramic article, comprising:

preheating a substrate to a temperature not less than about 200 °C, the substrate consisting essentially of alumina; and

thermally spraying a rare earth oxide layer on the substrate, the rare earth oxide layer having an adhesion strength of not less than about 15 MPa.

16. The method of claim 15, wherein said temperature is not less than about 250 °C.

17. The method of claim 15, wherein said temperature is not less than about 300 °C.

18. The method of claim 15, wherein the rare earth oxide layer consists essentially of yttria.

19. The method of claim 15 wherein the substrate consists essentially of α-alumina.

20. A semiconductor wafer processing apparatus, comprising:

a chamber, the chamber being at least partially defined by a chamber wall, the chamber wall being comprised mainly of a ceramic base material;

a corrosion-resistant layer lining the chamber wall and directly contacting the ceramic base material, the corrosion-resistant layer consisting essentially of a rare earth oxide and having adhesion strength of not less than about 15 MPa; and

a support for supporting a semiconductor wafer in the chamber.

21. The apparatus of claim 20, further comprising a gas inlet for passing at least one gas into the chamber.

22. The apparatus of claim 20, further comprising an electromagnetic field generator for generating an electromagnetic field for passage through the chamber wall.

23. The apparatus of claim 20, wherein the chamber wall comprises a sidewall portion.

24. The apparatus of claim 20, wherein the chamber wall comprises a lid.

25. The apparatus of claim 20, wherein the support comprises an electrostatic chuck.

26. The apparatus of claim 20, wherein the processing apparatus is an etching tool.

27. The apparatus of claim 20, wherein the ceramic base material comprises at least one component from the group consisting of alumina, silica, and aluminum nitride.

28. The apparatus of claim 27, wherein the ceramic base material comprises alumina.

29. The apparatus of claim 27, wherein the ceramic base material consists essentially of alumina.

30. The apparatus of claim 29, wherein the ceramic base material consists essentially of α-alumina

31. The apparatus of claim 20, wherein the corrosion resistant layer consists essentially of yttria.

32. The apparatus of claim 20, wherein the corrosion resistant layer has an adhesion strength of not less than 20 MPa.

33. The apparatus of claim 20, wherein the corrosion resistant layer is deposited on the ceramic base material by thermal spraying.

34. A method for processing semiconductor wafers, comprising:

placing a semiconductor wafer in a processing apparatus, the apparatus comprising a support for receiving the semiconductor wafer and a chamber in which the support is provided, the chamber being at least partially defined by a chamber wall comprised mainly of a ceramic base material, the chamber wall having a corrosion-resistant layer thereon directly contacting the ceramic base material, the corrosion-resistant layer consisting essentially of a rare earth oxide and having adhesion strength of not less than about 15 MPa; and

subjecting the semiconductor wafer to a processing operation, including introducing at least one processing gas into the chamber, the processing gas being introduced to react with the wafer.

35. The method of claim 34, further comprising subjecting the semiconductor wafer to an electromagnetic field.

36. The method of claim 34, wherein the processing gas comprises a halogen component.

37. The method of claim 34, wherein the processing gas removes material from the wafer.

38. The method of claim 34, further comprising dicing the semiconductor die into individual die forming semiconductor devices.

39. The method of claim 38, further comprising packaging the individual die.

40. The method of claim 38, wherein the individual die are memory or logic devices.